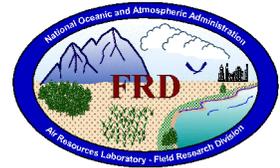




# FRD Activities Report

## April 2004



## Research Programs

### *Pentagon Shield*

Pentagon Shield is the name for the atmospheric tracer study being conducted at the Pentagon this coming May. The project has now grown to such an extent that we will use all of our operating real-time SF<sub>6</sub> analyzers (8) and all of our cardboard bag samplers (100). In addition, the number of test days has expanded from three to five and now includes and indoor as well as an outdoor component. All preparations for deployment to the field were completed by April 23, and the caravan of trucks and equipment departed for Washington, DC the next day. The road crew arrived on April 27 and the remainder of the FRD crew arrived the following day by air. The final two days in April were dedicated to unloading equipment and preparing for the field tests. By the end of the last day of April, everything was prepared for an initial shake-down test the next day. This was a remarkably short time for field installation and is one for the FRD record books. (Kirk Clawson and staff)

Preparations for the Pentagon Shield project were completed and the equipment shipped to Washington D.C. on April 24. The continuous analyzers will be run during transport to maintain their conditioning for the study. All cartridges for the Programmable Integrating Gas Samplers (PIGS) were cleaned and checked before shipping. They will be returned to Idaho Falls for analysis after the study. (Roger.Carter@noaa.gov, Debbie Lacroix)

### *CBLAST-High*

Analysis continues on data collected during Hurricanes Fabian and Isabel in September 2003. Final archived data were made available to the CBLAST community this month. Initial calculations of sensible and latent heat and momentum fluxes have been made and are to be presented at the 26<sup>th</sup> AMS Conference on Hurricanes and Tropical storms in early May. The results are very encouraging as co-spectra and total covariances from several independent instruments agree rather well. Preliminary results indicate a nearly constant profile for latent heat flux and momentum flux through the boundary layer, and a decrease with height for the sensible heat flux.

Preparations are under way for the upcoming 2004 hurricane season. Included in these preparations are new instrument circuit boards, slight modifications to the BAT housing to alleviate erosion in rain and graupel, and modest upgrades to the data system software. We are now completing calibration of the BAT and will begin assembly at FRD in early May. The system is scheduled for installation on the P3 during the last week of May with test flights scheduled for the third week of June. (Jeff.French@noaa.gov)

### ***ET Probe***

A rain storm on 8 April provided an opportunity to field test the newly modified ET probe at FRD. As discussed last month, the new ET probe has enlarged pressure ports designed to minimize the effect of rain water on the pressure measurements. The probe has been mounted on a pickup truck along with a Gill 3D sonic anemometer. On 8 April the truck was driven through a moderate rain cell to the east of Idaho Falls. The sonic data clearly show the effects of the rain, with many spikes in the wind data. The ET probe faired much better. In fact, the ET probe performance within the rain is basically indistinguishable from its performance when it was not raining. One issue that did come up in these road tests is that the velocity spectra for the  $v$  velocity component rolls off too steeply in the inertial subrange. It is not clear what causes this, although it is not related to the rain problem. (Richard.Eckman@noaa.gov)

### ***Smart Balloon***

Changes to and testing of the communications software are still taking place. Some changes to the transponder amplifiers are being made to improve sensor noise immunity. Fabrication of parts for the balloon cutdown and the transponder enclosure is in progress. We hope to receive an ozone instrument in the near future to test with our transponder. (Randy.Johnson@noaa.gov)

## **Cooperative Research with INEEL**

### ***Emergency Operations Center (EOC)***

On April 21, a drill was held at the Emergency Operations Center. The scenario involved a package delivered to an employee at Ft. St. Vrian exploding and injuring the employee. FRD Team A (Jeff French and Brad Reese) provided meteorological support.

### ***INEEL Support***

A draft manuscript entitled “Uncertainty in Dispersion Modeling as Derived from Bayesian Probability Theory” was completed in April and sent out for review. This work is a spinoff of an earlier study on worst-case dispersion scenarios at INEEL. The manuscript uses Bayesian probability theory to explore the sources of uncertainty in dispersion modeling. The approach leads to significantly different results compared to the more conventional approaches to uncertainty. As one example, the Bayesian approach indicates that the uncertainty associated with a particular model can change with time as users gain experience with the model. This dependence on past model experience does not appear in the conventional descriptions of uncertainty. (Richard.Eckman@noaa.gov)

## **Other Activities**

On April 14, Shane Beard judged entries for the Temple View Elementary School Science Fair. Students in the fifth and sixth Grades participated, and had some innovative and interesting projects. Later that afternoon, Shane did a presentation on weather for a fifth grade class. He performed a number of experiments to illustrate cloud formation and different types of clouds, the difference in size of cloud droplet and rain drops, barometric pressure measurements and how barometric pressure affects weather, and the effect of rapid changes in temperature and pressure. The students showed a great deal of interest in the demonstrations and gained an understanding of some principles of basic meteorology. Next month they will visit the FRD facility to see how meteorological measurements are collected and used. (Shane Beard and Staff)

### ***Travel***

Debbie Lacroix and Roger Carter to Tampa, Florida, April 12-16 for US EPA 23<sup>rd</sup> Annual National Conference on Managing Environmental Quality Systems.

Kirk Clawson to Washington, D.C., April 13-16 for Pentagon Shield Project logistics.

Tom Strong, Ryan Walker, and Mark Hoover to Washington D.C. April 24 through May 17. In addition to participating in the project, they drove the vehicles containing the samplers and tracer release equipment and supplies.

Kirk Clawson to Washington D. C., April 27 through May 14 for Pentagon Shield Project.

Roger Carter to Washington D. C. April 28 through May 11 for Pentagon Shield Project.

Tom Watson, Joyce Silvester, Shane Beard, Jason Rich, David George, and Dianne Hoover to Washington D.C. April 28 through May 14 for Pentagon Shield Project.